8.2 WATER QUALITY

Adequate water quality is necessary to maintain the chemical properties of the water column needed by bay scallop populations, as well as sustain SAV, shell bottom, and soft bottom habitats that support bay scallops and the estuarine system. Human activities that degrade water quality or alter water flow can negatively impact bay scallop growth or survival. Hydrological modifications, sediment loading and eutrophication are probably the greatest water quality concerns for bay scallops, primarily because of their effects on SAV. Refer to the SAV section for specific information of nutrient and sediment loading and the effect on water clarity and SAV.

The majority of the bay scallop population occurs within the White Oak river basin. The White Oak River basin contains Core, Bogue, and Stump sounds. These areas have historically had excellent water quality; however, human development in the area is growing rapidly. According to the 2001 river basin plan, the estimated population based on 1998 census data was 149,032, with an overall density of 146 people/mi^2, which is denser than the statewide average (DWQ 2001). From 1982 to 2001 urban land cover increased by 81%, primarily by conversion of farmland and forest (Street et al. 2005). The population in the basin is expected to increase by 40,000 by the year 2015. A lack of good environmental planning was identified as a threat to water quality in this river basin at public meetings (DWQ 2001). Proper planning is essential to minimize impacts from urbanization and development.

The 2001 Use Support ratings for the White Oak River basin are summarized in six categories. Aquatic life and shellfish harvest are the most biologically pertinent categories. The aquatic life category is an indicator of whether aquatic invertebrates and fish can adequately live in the waters. Benthic invertebrate and fish community data, ambient water quality, and National Pollution Discharge Elimination System (NPDES) data are considered in the assessment. All monitored waterbodies in the White Oak River basin were rated as fully supporting in the 2001 summary (DWQ 2001). In the shellfish harvesting Use Support category, 28,058 acres (24%) of the monitored waters were rated as impaired, and 89, 601 acres (76%) were rated as fully supporting. This information is determined by shellfish closures due to elevated levels of fecal coliform.

The percent of impervious surfaces in a watershed is strongly correlated with fecal coliform abundance (Mallin et al. 2000). Nonpoint stormwater runoff is the primary cause of water quality contamination in more than 90% of shellfish closures (G. Gilbert, DEH, personal communication 2002). Impairment by fecal coliform is therefore an indication that nonpoint pollution from stormwater runoff is degrading the impaired waters. Sources of bacterial contamination contributing to shellfish closures include urbanization, construction of roadways and parking lots, pet waste, unauthorized discharges of sewage effluent, failing onsite septic systems, animal operations, marinas, farmland, forestry operations, wetland loss, and hydrological alterations (DEM 1994; Frankenberg 1995; Reilly and Kirby-Smith 1999; Schueler 1999).